

NOTES ON THE BEHAVIOUR OF AN AUSTRALIAN CARPENTER BEE, GENUS *XYLOCOPA* LATR. (HYMENOPTERA: XYLOCOPINAE)

By Terry F. Houston

Unit 4, 18 Broad Street, Marden, S. Aust. 5070

Abstract

Some brief observations are reported of the behaviour of both sexes of a *Xylocopa* species in the Kimberley Division of Western Australia. Notes are provided on prolonged hovering by males, mating, foraging and interaction of females in a nest.

Introduction

Although the Australian *Xylocopa* were included in a revision by Lieftinck (1957), the species dealt with here could not be positively identified on the basis of that work. Certainly, however, it is very like the common north-eastern Australian species, *X. aruana* Ritsema. The identity of the species may be checked by reference to specimens which I have deposited in the South Australian Museum, Adelaide.

Hovering and Mating

Males of several exotic species of *Xylocopa* have been reported to establish territories, centred either on nests occupied by females or on foliage (Hurd 1958, Janzen 1964, 1966, Cruden 1966, O'Brien 1966, and others). Males hover within these territories chasing off males of the same species or even other insects which may intrude. Reports of mating are few and generally uninformative, but Cruden (1966) describes how hovering males of *X. c. californica* pounced on females returning to their nests.

Previously, nothing has been recorded of the habitats of males of Australian *Xylocopa*. However, on May 10, 1973, on Mt. Hart Station, about 150 km ENE of Derby, W.A., a *Xylocopa* male was discovered hovering about 3 m above the ground in the canopy of a *Eucalyptus* tree. Its hum was audible from 10 m away. The bee hovered in one spot in the shade of a clump of leaves, slowly rotating about a vertical axis as if suspended by a thread. Occasionally, it darted off to circle the clump of leaves or to pursue passing butterflies but each time it returned quickly to hover in the original spot. The tree was not in flower nor were there any nests of the bee in its branches. Time of observation was shortly after sunrise and 20 minutes in duration.

Two days later in the Phillips Range (230 km ENE of Derby) several males were observed engaged in similar behaviour in the canopies of *Eugenia* trees between 6.45 a.m. and 8.15 a.m. On one occasion, a male moved from its usual position and approached another hovering 2.5 m away in the same canopy. A confrontation ensued with the males facing and circling each other. Then, after a brief chase, the second male returned to hover in its original position.

At another tree where a male hovered, a female arrived and flew several times about the canopy. As she passed close to the male, he

became obviously excited and darted around his clump of leaves as if attempting to locate the female. However, no encounter occurred.

Twice during observation here, loudly buzzing pairs of adults tumbled from tree canopies into the grass below. One pair was netted and proved to be a male and female; the other, which parted and flew off after a few seconds, had also appeared to contain both sexes.

These observations suggest that males establish and defend territories and that females are attracted to them for the purposes of mating. Since there were neither flowers nor nests to draw females to the trees where mating was observed, it may be that males attract females by a pheromone.

At the time of the above observations, 9 occupied nests were collected in dead branches from trees and opened. Each contained from 1-5 adult females, 5 contained pharate adults and pupae, but none contained earlier stages or provisions. Thus, it appeared that a new generation was in the process of emerging.

Foraging

During late April and early May, 1973, in the Kimberley Division, most *Xylocopa* females were observed at flowers from shortly before sunrise until about 10 a.m. Activity was greatest around sunrise and gradually tapered off. After feeding, females returned to the nests. Flowers visited include *Acacia*, *Crotalaria*, *Eucalyptus* and *Passiflora*. The bees appear to be attracted to bright colours for many of them came to inspect our orange tent and articles of clothing hung on a line.

Female interaction

At Winjana Gorge (137 km E of Derby), a nest in a nearly horizontal dead branch was found 2 m above the ground when a female flew to it and entered through a neat round hole on the underside of the branch. When I examined the entrance hole, a female was resting within, looking out. A second female then appeared at the opposite side of the entrance from within and attempted to emerge. However, the first female struck out with a fore leg in a rapid jabbing motion causing the second to withdraw. Several times the second female attempted to move into the entrance hole but each time was repelled by fore leg blows from the first. It is tempting to interpret this behaviour as one female warning another of danger outside the nest but a single observation such as this allows no firm conclusions. At least, it suggests that there may be interesting aspects of the behaviour of *Xylocopa* adults yet to be discovered by closer study.

Acknowledgements

My wife, Carol Houston, provided much assistance in the field with collection of nests and recording of observations for which I am extremely grateful.

References

- Cruden, R. W., 1966. Observations on the behaviour of *Xylocopa c. californica* and *X. tabaniformis orpifex* (Hymenoptera: Apoidea). *Pan-Pacif. Ent.* 42: 111-119.

- Hurd, P. D., 1958. Observations on the nesting habits of some New World carpenter bees with remarks on their importance in the problem of species formation (Hymenoptera: Apoidea). *Ann. ent. Soc. Amer.* 51: 365-375.
- Janzen, D. H., 1964. Notes on the behaviour of four subspecies of the carpenter bee *Xylocopa* (*Notoxylocopa*) *tabaniformis*, in Mexico. *Ann. ent. Soc. Amer.* 57: 296-301.
- Janzen, D. H., 1966. Notes on the behaviour of the carpenter bee *Xylocopa fimbriata* in Mexico (Hymenoptera: Apoidea). *J. Kansas ent. Soc.* 39: 633-641.
- Lieftinck, M. A., 1957. Revision of the carpenter-bees (*Xylocopa* Latr. subgenus *Maiella* Michener) of the Papuan Region. *Nova Guinea* (n.s.)8(2): 325-376.
- O'Brien, L. B. and O'Brien, C. W., 1966. Observations on territoriality and a new nesting substrate of *Xylocopa californica arizonensis* Cresson (Hymenoptera: Apoidea). *Pan-Pacif. Ent.* 42: 27-29.

FURTHER NOTES ON THE RESPONSE OF QUEENSLAND DANAID BUTTERFLIES TO SELECTIVE ATTRACTANTS.

By Andrew Atkins

Flat 1, 15 Booker Street, North Rockhampton, Queensland, 4701.

Following reports of adult danaid butterflies feeding on the leaves and stems of certain pyrrolizidine alkaloid-containing plants in central Queensland (Atkins, 1974) I have found another plant attractant growing in this area.

Danaus hamatus hamatus (W. S. Macleay) was seen, in some numbers, attending *Parsonsia eucalyptophylla* F. Muell. (Family Apocynaceae) on three occasions in January and February, 1974, at Grantleigh, west of Rockhampton.

Using dried samples of this plant, a bait was set in my garden in January which continued to attract the five common species of *Euploea* and *Danaus* found in the Rockhampton area. The bait was visited by male and occasionally female butterflies until early in May when few danuids remained on the wing. One male *Danaus chrysippus petilia* (Stoll) visited the bait intermittently for two days. Other danuids were observed to attend the bait for as much as five consecutive hours.

Dr. John Edgar (pers. comm.) has since found that *P. straminea* and the root bark of *P. eucalyptophylla* contain the type of pyrrolizidine alkaloids which act as precursors of danaid pheromones.

Further to my observations (Atkins, 1974), Dr Edgar has drawn my attention to a report by McCann (1953) of both larvae and adult danuids feeding on a species of *Crotalaria*.

References

- Atkins, A. F., 1974. Observations on the response of Queensland danaid butterflies to selective attractants. *Aust. ent. Mag.* 1(6): 78-80, pl. 1.
- McCann, C., 1953. Aposematic insects and their food plants. *J. Bombay nat. Hist. Soc.* 51: 752-754.